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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,857

11/17/2005

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7590

12/15/2008

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EXAMINER

WU, IVES J

ART UNIT

PAPER NUMBER

1797

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DELIVERY MODE

12/15/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/529,857	Applicant(s) GJERTSEN ET AL.	
	Examiner IVES WU	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-6, 9-12 and 14-16 is/are rejected.
- 7) ☒ Claim(s) 2-3, 7-8, 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

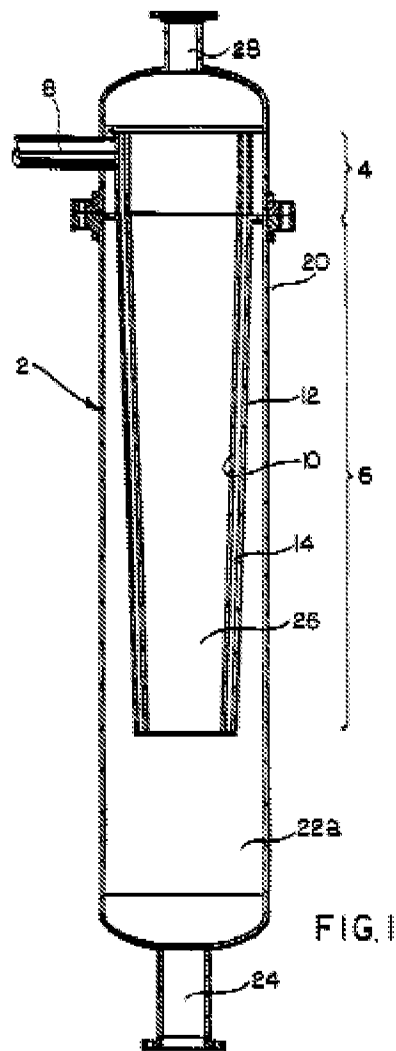
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(1). **Claims 11-12, 4, 16** are rejected under 35 U.S.C. 102(b) as being anticipated by Greene et al (US 6019825A).

As to a standing vessel having a substantially round cross section, an inner wall, a lower liquid outlet and an upper gas outlet in a scrubber for separating constituents including a liquid phase from a substantially gaseous fluid flow in **independent claim 11**, Greene et al (US 6019825A) disclose a hydrocyclone gas separator (Title). The input stream may consist of any combination of phases, such as solid/liquid, liquid/gas, or all three phases (Col. 3, line 55-57). While the hydrocyclone embodiments described in this application are oriented in the preferred vertical direction, horizontal orientation is also possible (Col. 2, line 64-67). It is well known in the art that cyclone has round cross section. As further illustrated in the Drawing below, the inner wall and 22a for the heavy fraction (liquid if input stream is gas/liquid) and outlet 24 (Col. 4, line 54-56). The light fraction (e.g. gas and/or liquid) is drawn upward through center area 26 toward outlet 28 (Col. 4, line 58-60).

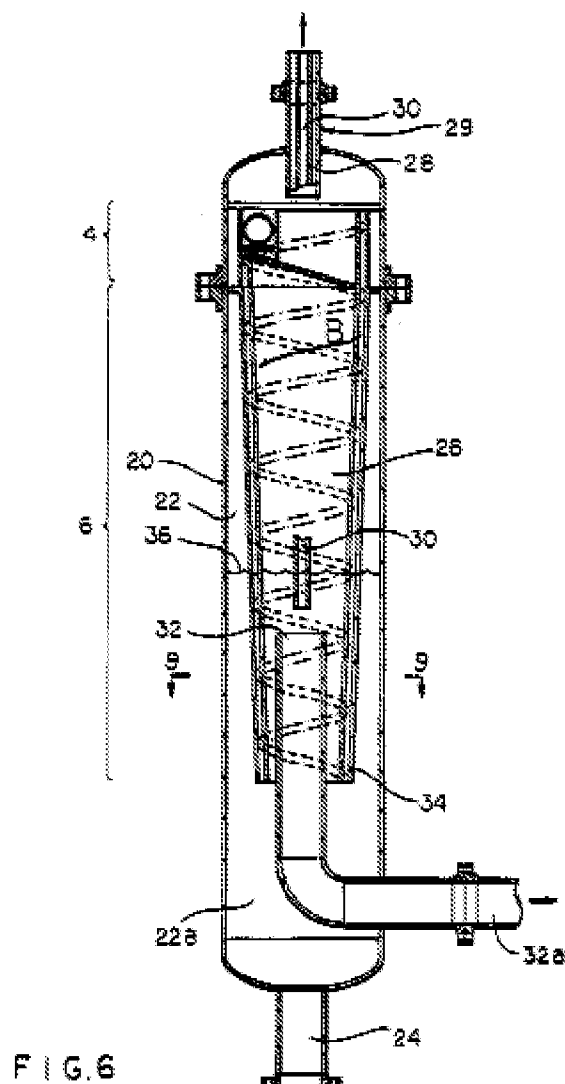


As to a fluid inlet directing fluid introduced into the scrubber along the inner wall in a scrubber in **independent claim 11**, and fluid inlet being oriented so as to be tangential to the inner wall of the scrubber in **claim 12**, Greene et al (US 6019825A) disclose a mixed phase stream entering the cyclone under very high velocity through inlet 8 into transition nozzle 9. The inlet nozzle 9 protrudes inside the body of the transition section 4, situated horizontally and tangentially with respect to the inside wall 13 of the transition section (Col. 4, line 28-35).

As to a fluid way to be arranged as a downward directed spiral along the inner wall of the scrubber, that extends from the vicinity of the fluid inlet to the vicinity of the liquid outlet, that has an opening allowing gas to escape inward to a central region of the scrubber, such that all

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fluid introduced into the fluid way is passed down the full length of the fluid way, except the escaped gas in a scrubber in **independent claim 11**, Greene et al (US 6019825A) disclose Figure 6, which illustrate the features as claimed.



With reference to Figure 6-9, a further embodiment of the apparatus comprises a structural helical path defining means consisting of a helical dividing means situated within the annular space, bridging the width between the inner shell and the outer shell, and defining the helical path between successive turns of the helical dividing means 16 (Col. 5, line 47-52). Thus, a series of perforations 50 through the tube 16, along the length thereof, which perforations communicate the inside of the helical path 14 with the inside of the hollow tube 52, can be

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provided to allow for withdrawal of gases from the cycloning, mixed input stream (Col. 6, line 10-14), which reads on the limitations of instant claim.

As to the fluid way being a spiral-shaped pipe placed within the scrubber and the spiral-shaped pipe being oriented in direct elongation from a tangential inlet, extends to just above the liquid outlet and having at least one opening for gas escape in **claim 4**, and at least one opening in the spiral-shaped pipe comprising a plurality of openings over the length of the pipe in **claim 16**, Greene et al (US 6019825A) disclose, with reference to Figure 6-9, a further embodiment of the apparatus comprises a structural helical path defining means consisting of a helical dividing means situated within the annular space, bridging the width between the inner shell and the outer shell, and defining the helical path between successive turns of the helical dividing means 16 (Col. 5, line 47-52). Thus, a series of perforations 50 through the tube 16, along the length thereof, which perforations communicate the inside of the helical path 14 with the inside of the hollow tube 52, can be provided to allow for withdrawal of gases from the cycloning, mixed input stream (Col. 6, line 10-14), which reads on the limitations of instant claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

(2). **Claim 14** is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (US 6019825A) in view of Borsheim (US 3792573).

As to fluid inlet being provided with a deflection plate for fluid introduced into the scrubber in **claim 14**, Greene et al **do not teach** the use of deflection plate.

However, Borsheim (US 3792573) **teaches** air cleaning structure (Title). Generally stated the structure herein comprises a cylindrical housing having a tangential deflection plate directing air inwardly setting up a centrifuging action for separation of dust particles into a radially narrow duct at the inner side of the outer wall of housing (Col. 1, line 53-57).

The advantage of deflection plate is to direct air inwardly setting up a centrifuging action for separation of dust particles into a radially narrow duct at the inner side of the outer wall of housing (Col. 1, line 53-57).

Therefore, it would have been obvious at time of the invention to install the deflection of Borsheim for the fluid inlet of hydrocyclone gas separator disclosed by Greene et al in order to attain the cited above advantage.

(3). **Claims 5-6, 10 and 15** is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (US 6019825A).

As to scrubber being shaped as a truncated cone and fluid way being in form of a longitudinal, spiral-wound open pipe adapted to shape of the scrubber in **claim 5**, the disclosure of Greene et al is incorporated herein by reference, the most subject matter of spiral-wound open pipe as currently claimed, has been recited in Applicants' claim 4, and has been discussed therein. It would be obvious to have truncated cone shape because change in shapes does not affect functions. *In re Dailey* 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

As to vortex breaker being arranged above the upper gas outlet of the scrubber in **claim 6**, Greene et al (US 6019825) disclose, in addition, it is possible that 2nd gas/liquid separator arrangement may be used with hydrocyclones. Gas with entrained liquid flows from cyclone 2 up through column 28, which acts as an inlet to the gas/liquid separator 60, as shown in Figures 10-12 (Col. 6, line 29-34). A mixed gas/liquid stream enters through uptake 28 and flows into space 78 in upward orientation (Col. 6, line 54-55). Greene et al **do not teach** the vortex breaker being arranged above the upper gas outlet of the hydrocyclone as claimed.

However, it would be obvious to install the vortex breaker above the gas outlet of hydrocyclone disclosed by Greene et al because it would eliminate the radial flow and become more upward as well known in the art, therefore to reduce the pressure drop in the uptake pipe.

As to at least one opening in the spiral-shaped pipe being a slit extending over the length of the pipe in **claim 15**, Greene et al (US 6019825A) disclose slit in Figure 5 & 5A, it would be obvious to have a slit extending over the length of the pipe because design changes does not affect functions. MPEP §§ 2144.04.

As to fluid way to be completely closed for gas escape at fluid inlet, but becoming gradually open for escape of gas towards the liquid outlet, and fluid way having about 5 revolutions in the total in **claim 10**, in the absence of showing criticality of the records, it would be obvious to have closed fluid way at beginning section and becoming gradually open for escape of gas toward liquid outlet because the dynamic separation based on rotation becomes more effective along the spiral fluid way. The optimized revolutions of fluid way to be about 5 turns in such know process render prima facie obvious within one of ordinary skills in the art. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

(4). **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over Greene et al (US 6019825A) in view of Newton (US 3997303).

As to scrubber further comprising equipment for demisting arranged between the fluid inlet and the upper gas outlet and equipment for vortex breaking arranged between a lower end of the fluid way and the liquid outlet in **claim 9**, Greene et al **do not teach** the demisting equipment and vortex breaker for liquid outlet in hydrocyclone as claimed.

However, Newton (US 3997303) **teaches** the liquid-gas phase separator having a perforated plate and mist eliminator pad (Title). a mist eliminator pad disposed between the feed inlet and gas outlet (Abstract, line 5-6).a vortex breaker 25 is positioned above the liquid outlet 24 (Col. 2, line 58).

The advantage of mist eliminator pad is to improve the efficiency in removal of entrained liquid (Abstract, line 10-11) and vortex breaker is to break any vortex that might form during the discharge of liquid layer 23 from liquid outlet 24 (Col. 2, line 59-61).

Therefore, it would have been obvious at time of the invention to install a demister before the gas outlet and vortex breaker at liquid outlet disclosed by Newton in the hydrocyclone of Greene et al in order to attain the cited-above advantage.

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Allowable Subject Matter

(5). **Claims 2-3, 7-8 and 13** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

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Date: December 5, 2008

/Duane S. Smith/

Supervisory Patent Examiner, Art Unit 1797

12-9-08